PROJECT NUMBER: 0400
PROJECT TITLE: Low Density Rod Development
PROJECT LEADER: R. S. Mullins
PERIOD COVERED: February, 1988

LOW DENSITY ROD

A. **Objective**: Develop a continuous process for the production of reduced density cigarettes.

B. **Results**: Additional testing of the modified microwave cavity with the alumina pass tube was conducted. The application of vacuum at either end of the tube was found to be unsatisfactory as it resulted in excessive vibration of the tube belt within the cavity. Applying compressed air to the cavity and allowing the air to exit through the pass tube, via the slot in the tube, prevented the build-up of filler particles but did not prevent the build-up of condensed tobacco volatiles on the wall of the tube. The standard cavity, without a pass tube, was subsequently modified to increase the air flow through it by perforating a section of waveguide to allow air to more easily enter the cavity and by increasing the diameter of the holes through which suction is applied to the cavity. The increased air flow produced by these modifications greatly reduced filler build-up without any apparent condensation of tobacco volatiles. Possible additional cavity improvements and alternate designs will be discussed on March 9 with Charles Buffler, a microwave consultant associated with General Foods.

Results from the Dextran evaluation indicated that increasing the binder level from 6% to 8% improved firmness but further increasing the level to 10% provided no additional improvement. Even at the 8% level, however, the Dextran continued to produce less firm cigarettes than did pectin. Significantly more filler degradation was observed in this test in the coating operation using uncased all-lamina filler than was observed in the previous test using cased Marlboro filler without ET, ES, or aftercut. Since application of the Dextran requires only about 5 minutes, this indicates that most of the degradation of the uncased all-lamina filler is occurring very rapidly at the beginning of the binder application procedure and is further evidence that a casing system is needed for the all-lamina blend being used in the low density program.

No significant differences were detected between the physical quality of cigarettes produced with pectin having a 40% degree of esterification (DE) and that of cigarettes produced with the normal pectin having a 65% DE. As reported last month, however, the binding obtained with pectin having only a 4% DE was so poor that no cigarettes could be produced with it in the low density process. The coating obtained with the 40% DE pectin resembled that obtained with the 60% DE pectin at addition levels of 6% but did not appear as consistent or smooth at addition levels of 9% and 12%. The coating obtained with the 4% DE appeared very variable and had many more tendrils extending from the shred surfaces.

Production of cigarettes for the study to determine the effect of molecular weight on the performance of Genu pectin has been completed and the cigarettes submitted for testing. Evaluations of low density

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samples produced for sidestream studies have not yet been completed. Maker modifications completed this month included installation of a motor and drive unit for the carding drums, a fan for the overhead transfer belt, and an improved steaming garniture.

C. **Plans**: During the week of March 14, produce cigarettes for an investigation of the effects of density, blend, cut width, paper weight, paper porosity, and paper additive on the physical, smoking, and subjective characteristics of low density cigarettes. Compile and evaluate data from the molecular weight study. Conduct preliminary evaluations of binder application to filler at the maker. Begin production of cigarettes for an evaluation of the effects of filler CV, OV, and size on the firmness of bound rods.

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